

## WHAT IS CLAIMED IS:

1                   1.       A method of preparing a nucleic acid array on a support, said  
2 method comprising synthesizing a plurality of nucleic acids on said support wherein the  
3 synthesis steps are carried out in a non-oxidizing atmosphere.

1                   2.       A method in accordance with claim 1, wherein each nucleic acid  
2 occupies a separate predefined region of the support, said synthesizing comprising:

3                   (a) activating a region of the support;

4                   (b) attaching a nucleotide to a first region, said nucleotide having a  
5 masked reactive site linked to a protecting group;

6                   (c) repeating steps (a) and (b) on other regions of said support whereby  
7 each of said other regions has bound thereto another nucleotide comprising a masked  
8 reactive site link to a protecting group, wherein said another nucleotide may be the same  
9 or different from that used in step (b);

10                  (d) removing the protecting group from one of the nucleotides bound to  
11 one of the regions of the support to provide a region bearing a nucleotide having an  
12 unmasked reactive site;

13                  (e) binding an additional nucleotide to the nucleotide with an unmasked  
14 reactive site;

15                  (f) repeating steps (d) and (e) on regions of the support until a desired  
16 plurality of nucleic acids is synthesized, each nucleic acid occupying separate predefined  
17 regions of the support;

18                  wherein each of steps (a) through (f) are carried out in a non-oxidizing  
19 atmosphere.

1                   3.       A method in accordance with claim 1, wherein said synthesizing  
2 comprises the sequential steps of:

3                   a) generating a pattern of light and dark areas by selectively irradiating at  
4 least a first area of a surface of a substrate, said surface comprising immobilized  
5 nucleotides on said surface, said nucleotides capped with a photoremovable protective  
6 group, without irradiating at least a second area of said surface, to remove said protective  
7 group from said nucleotides in said first area;

8                   b) simultaneously contacting said first area and said second area of said  
9 surface with a first nucleotide to couple said first nucleotide to said immobilized

nucleotides in said first area, and not in said second area, said first nucleotide capped with said photoremovable protective group;

c) generating another pattern of light and dark areas by selectively irradiating with light at least a part of said first area of said surface and at least a part of said second area to remove said protective group in said at least a part of said first area and said at least a part of said second area;

d) simultaneously contacting said first area and said second area of said surface with a second nucleotide to couple said second nucleotide to said immobilized nucleotides in at least a part of said first area and at least a part of said second area;

e) performing additional irradiating and nucleotide contacting and coupling steps so that a matrix array of at least 100 nucleic acids having different sequences is formed on said support;

with the proviso that steps (a) through (e) are performed in said non-oxidizing atmosphere, and said atmosphere has an ozone concentration of from about 0 to about 5 ppb.

4. A method in accordance with claim 3, wherein said atmosphere is carbon-filtered air.

5. A method in accordance with claim 3, wherein said atmosphere is an inert gas.

6. A method in accordance with claim 3, wherein said atmosphere is argon.

7. A method in accordance with claim 3, wherein said substrate is irradiated with light directed from a source at a position opposite the surface comprising said immobilized nucleotides.

8. A method in accordance with claim 3, wherein said substrate is irradiated with light directed from a source on the same side of the surface comprising said immobilized nucleotides.

9. A method in accordance with claim 3, wherein said substrate is irradiated with light from a position opposite the surface comprising said immobilized nucleotides and said atmosphere is an inert gas atmosphere.

1                   10.    A method of preparing and packaging a nucleic acid array, said  
2 method comprising,

3                   (a) preparing a nucleic acid array according to the method of claim 1; and  
4                   (b) packaging said nucleic acid array in an enclosure having a non-  
5 oxidizing atmosphere.

1                   11.    A method in accordance with claim 10, wherein each of said steps  
2 is conducted in a facility having an atmosphere comprising 5 ppb or less ozone.

1                   12.    A method in accordance with claim 10, wherein for the period of  
2 time between said preparing and packaging steps, said nucleic acid array is exposed to  
3 unfiltered air for a period of 2 hours or less.

1                   13.    A method of preparing a nucleic acid array, said method  
2 comprising attaching each of a plurality of nucleic acids to a solid support at preselected  
3 locations to provide said array, wherein said attaching is carried out in a non-oxidizing  
4 atmosphere.

1                   14.    A method in accordance with claim 13, said atmosphere  
2 comprising ozone at a concentration of from about 0 to 5 ppb.

1                   15.    A method in accordance with claim 2, wherein each of said nucleic  
2 acids comprise from 5 to 30 nucleotide residues.

1                   16.    A nucleic acid array prepared by the method of claim 1.

1                   17.    A nucleic acid array prepared and packaged by the method of claim  
2 10.